APPENDICES

APPENDIX A

DRILLING MUD MATERIALS

Drilling materials identified as toxic or hazardous are to be handled, stored and transported in accordance with Chapter 173-303 WAC.

FUNCTION	MATERIALS	WHY USED
Lubricants	Certain oils, graphite powder and soaps	To reduce downhole friction
Flocculants	Salt, hydrated lime, gypsum and sodium tetraphosphates	To increase gel strength. Causes some solids to settle out
Filtrate Reducers	Bentonite clays, sodium carboxy-methyl cellulose (CMC) and pregelatinized starch	Reduce filter loss. Prevent "water loss" to porous formations
Foaming Agents	Anionic foaming chemicals	Causes formation water to foam helping gas or air drilling to continue
Restore Circulation	Asphalt emulsions, asbestos fibers, shredded plastics mica flakes, nut hulls, cedar fibers, cottonseed hulls and many other materials	To stop mud loss to porous zones
Shale Control Inhibitors	Gypsum, sodium silicate, chrome lignosulfates, lime and salt	To stop or prevent swelling of shales or clays
Surface Active Agents	Surfactant chemicals	To permit better mixing. Example: water and oil
Thinners and Dispersants	Quebracho, some polyphosphates and lignitic materials	To prevent too high a viscosity, improve pumpability, provide better solids distribution in muds

FUNCTION	MATERIALS	WHY USED
Viscosifiers	Bentonite, CMC, attapaulgite clays and asbestos fibers	To increase viscosity for cuttings removal and gel strength
Preservatives	Formaldehyde	Prevent starch mud from fermenting
Cement Decontamination	Sodium bicarbonate	Prevents mud destruction
Calcium Removers	Caustic soda, soda ash, certain polyphosphates (SAPP) and sodium bicarbonate	To prevent mud destruction by gypsum or anhydrite
Weight Materials	Barite, lead compounds, iron oxides and high specific gravity compounds	To increase mud weight (pounds per gallon) to hold formation fluids in place and prevent hole caving
Corrosion Inhibitors	Hydrated lime, amine salts and dichromate salts	To prevent corrosion of drilling equipment and casing
Oil Emulsion	Special emulsifiers or soaps	To make oil-in-water or water-in-oil emulsions for "oil base" mud

Sources:

American Association of Oilwell Drilling Contractors. Toolpusher's Manual. Section O. September 1970.

Gatlin, Carl. "Drilling and Well Completions." In Petroleum Engineering. Chapter 6. Prentice-Hall, Inc. New York. 1960.

APPENDIX B

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
BRIAN J. BOYLE, Commissioner of Public Lands

OIL AND GAS LEASE INSPECTION REPORT

Date 4-13-84

Applicant's Name SENTURY DE BOIS PETROLEUM Application No. 95585

The following items pertain to the area to be leased:

1. Surface Ownership: State [X] Deeded [ ] Both [X]

   NE¼ NE¼ SURFACE RIGHTS DEEDED TO [illegible] DAMS
   (Name of surface owner if other than state)

2. Current Use Forestry

3. Ground Cover Second growth timber

4. Topography Gentle to moderate

5. Access: State [X] Private [ ] Other [ ]

   COUNTY and DNR ROADS
   (Explain) COUNTY REQUIRES ROAD PERMIT FOR HEAVY EQUIPMENT

6. Zoning FORESTRY AND AGRICULTURE
   (Obtain from current County Comprehensive Plan)

7. Archeological/~~Historical site~~? [illegible]angered plant[illegible]? Yes [X] No [ ]

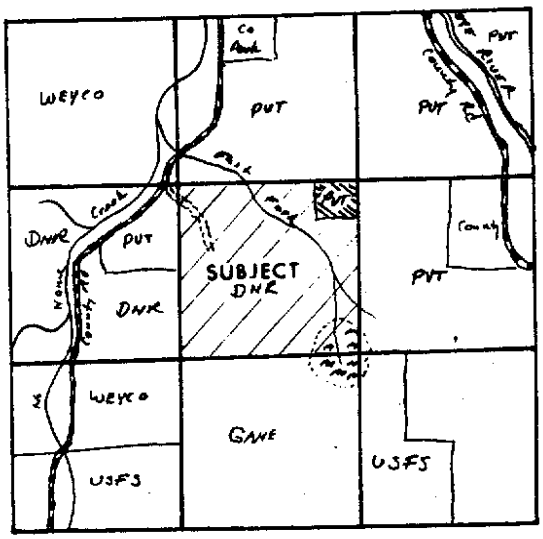
8. Other Information TYPE 2,3,4,5 [illegible] in area.
   TYPE 4,5 water on DNR land. 07-001164 RESOURCE AREA
   93-001787 PLANT [illegible] 002286 SPECIAL ANIMAL

Sec. 16 Township 18 [illegible] 3 E, W.M. THURSTON County

Scale: [illegible]" = 4,000 feet

On the plat, indicate the location of the following on the property and within one mile radius of property:

1. Surface ownership, if ownership other than state.
2. Adjacent surface ownership.
3. Incorporated areas.
4. Municipal watersheds.
5. Natural Area Preserves, endangered species, plant and animals.
6. Rivers, lakes, wetlands and other natural features.
7. Residences and other buildings.
8. Ground cover.
9. Game Department lands.
10. State parks and other parks.
11. Any other significant features.



RES 30-1820 (12-82)